

## LISTING OF THE CLAIMS

### 1.-34. (canceled)

**35. (currently amended)** A device for detecting ionizing radiation, comprising: an array of wires embedded in ~~the material of claim 1~~ a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first ~~set~~ plurality of parallel spaced apart wires intersecting orthogonally with a second ~~set~~ plurality of parallel spaced apart wires, wherein each wire in the first plurality intersects with each wire in the second plurality; and means for supplying power to the array.

**36. (currently amended)** The device of claim 35, wherein the wires in each array are spaced at a distance of from  $10\mu\text{m}$  to  $100\mu\text{m}$  apart.

**37. (currently amended)** A device for detecting ionizing radiation, comprising: a plurality of layers joined together to form a multilayer stack, wherein each layer comprises an array of wires embedded in ~~the material of claim 1~~ a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first ~~set~~ plurality of parallel wires intersecting orthogonally with a second ~~set~~ plurality of parallel wires; and means for supplying power to each array.

**38. (currently amended)** The device of claim 37, wherein the wires in each array are spaced at a distance of from  $10\mu\text{m}$  to  $100\mu\text{m}$  apart.

### 39. (canceled)

**40. (currently amended)** A device for detecting ionizing radiation, comprising:

a pair of electrodes, each having a length and width, wherein the length is greater than the width;

a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm disposed between said electrodes,

wherein the combination of electrodes and  $\pi$ -conjugated ~~polymer~~ material is rolled up along their length to form a generally cylindrical-shape structure; and  
means for providing power to said electrodes.

**41.-46. (canceled)**

**47. (currently amended)** ~~The material~~ The device as in any one of claims ~~1, 3, 12, 24, 35, 37~~ and 40 wherein an external stress is applied to the  $\pi$ -conjugated material by stretching ~~the  $\pi$ -conjugated material to strain and orient the polymer chains.~~

**48. (currently amended)** The device of claim 47, wherein the external stress is applied at a temperature above the glass transition temperature of the material and below the melting temperature.

**49. (canceled)**

**50. (currently amended)** A device for detecting ionizing radiation, comprising:  
electrodes, wherein said electrodes are ~~composed of~~ silicon wafers having prefabricated pulse detection circuitry patterned thereon;  
~~the material of claim 1~~ a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm disposed between said electrodes; and  
power supply means for providing power to said electrodes.

**51. (currently amended)** A method for detecting ionizing radiation, comprising:  
providing an array of wires embedded ~~in the material of claim 1~~ a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first ~~set~~ plurality of parallel spaced apart wires intersecting orthogonally with a second ~~set~~ plurality of parallel spaced apart wires, wherein each wire in the first plurality intersects with each wire in the second plurality;  
supplying electric power to the array;  
inserting the array into a radiation field; and  
detecting the signal generated when radiation strikes the wires.

- 52. (previously presented)** The method of claim **51**, wherein the array is a multilayer array.
- 53. (new)** The device as in any one of claims **35** or **37**, wherein the wires are electrically conducting oxides, electrically conducting polymers or combinations thereof.
- 54. (new)** The device of as in any one of claims **35**, **37**, **40**, and **50** wherein the  $\pi$ -conjugated material comprises a mixture of  $\pi$ -conjugated materials.
- 55. (new)** The device of claim **54**, wherein the  $\pi$ -conjugated material includes  $\pi$ -conjugated polymers having long chains of alternating single and double carbon-carbon bonds, polyaromatic hydrocarbons, or quinolates.
- 56. (new)** The device of claim **55**, wherein the  $\pi$ -conjugated polymers are selected from the group of polymers consisting of polyacetylenes, polypyrroles, polyfluorines, and derivatives and combinations thereof.
- 57. (new)** The device of claim **56**, wherein the derivative  $\pi$ -conjugated polymer is selected from the list of polymers consisting of poly(1-methoxy-4-(2-ethylhexyloxy)-2,5-phenylenevinylene), poly(2,5-dioctyloxy-p-phenylenevinylene), poly(3,4-ethylene dioxythiophene), and poly(3-octylthiophene), and combinations thereof.
- 58. (new)** The device of claim **55**, wherein the polyaromatic hydrocarbons include naphthalene, anthracene, or rubrene.
- 59. (new)** The device of claim **55**, wherein the  $\pi$ -conjugated polymers are mixed with organic polymers.
- 60. (new)** The device of claim **59**, wherein the organic polymers include polystyrene or poly(methyl methacrylate).
- 61. (new)** The device as in any one of claims **35**, **37**, **40** and **50** wherein a metal is incorporated into the structure of the  $\pi$ -conjugated material.

**62. (new)** The device of claim **61**, wherein the metal is aluminum, gallium, boron or lithium and salts thereof.

**63. (new)** A method for tracking 1-10 MeV particles, comprising;

providing a plurality of layers, wherein each layer consists of an array of wires embedded in a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first plurality of parallel spaced apart wires intersecting orthogonally with a second plurality of parallel spaced apart wires, wherein the parallel wires in each array are spaced at a distance of between 10-100  $\mu$ m apart and wherein each wire in the first plurality intersects with each wire in the second plurality;

supplying electric power to the array;

inserting the array into a radiation field; and

detecting the signal generated when radiation strikes the wires.

**64. (new)** A method for tracking 1-10 MeV neutrons, comprising:

providing a plurality of layers, wherein each layer consists of an array of wires embedded in a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first plurality of parallel spaced apart wires intersecting orthogonally with a second plurality of parallel spaced apart wires, wherein the parallel wires in each array are spaced at a distance of between 10-100  $\mu$ m apart and wherein each wire in the first plurality intersects with each wire in the second plurality;

supplying electric power to the array;

inserting the array into a radiation field; and

detecting the signal generated when radiation strikes the wires.

**65. (new)** A method for detecting d,t reactions, comprising:

providing a plurality of layers, wherein each layer consists of an array of wires embedded in a solid organic semiconducting material consisting essentially of a  $\pi$ -conjugated material having an electrical resistivity of at least  $10^9$  ohm-cm, the array comprising a first

plurality of parallel spaced apart wires intersecting orthogonally with a second plurality of parallel spaced apart wires, wherein the parallel wires in each array are spaced at a distance of between 10-100  $\mu\text{m}$  apart and wherein each wire in the first plurality intersects with each wire in the second plurality;

supplying electric power to the array;

inserting the array into a radiation field; and

detecting the signal generated when radiation strikes the wires.